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REMARKS

Entry of this §1.116 Amendment is proper. Since the amendments above narrow the issues for appeal and since such features and their distinctions over the prior art of record were discussed earlier, such amendments do not raise a new issue requiring a further search and/or consideration by the Examiner. As such, entry of this Amendment is believed proper and Applicant earnestly solicits entry. No new matter has been added.

Claims 1-3, 5-10, 12 and 14-16 are all the claims presently pending in the application. Contrary to the statement in the August 26, 2002 Office Action, claim 13 was canceled by the Applicant on June 7, 2002. Claims 1, 12 and 14-16 have been amended to more particularly define the invention and claim 4 has been canceled. Claims 1 and 16 are independent.

Attached hereto is a marked-up version of the changes made to the claims by the current Amendment. The attached page is captioned "Version with markings to show changes made." These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicant also notes that, notwithstanding any claim amendments herein or later during prosecution, that Applicant's intent is to encompass equivalents of all claim elements.

This Amendment amends claim 1 to clarify the feature of the switch being adapted to select either of one first printed-circuit board connected to the second printed-circuit board and another first printed-circuit board connected to the second printed-circuit board and that the

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second printed circuit board is separated from an upper system in structure and includes an interface control circuit that interfaces with the upper system.

Claims 1-10 and 12-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takao, et al. (Japanese Patent No. 5-81846A).

This rejection is respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

A first exemplary embodiment of the claimed invention is directed to a magnetic disk apparatus including: a disk enclosure; a first printed-circuit board (21 and 22 in Fig. 2, all reference numerals used herein being for exemplary purposes only and not for limiting the claims in any way); and a second printed-circuit board (23 in Fig. 2). The first printed-circuit board is paired with the disk enclosure (see Fig. 1). The second printed-circuit board is connected to said first printed-circuit board via a cable and is separated in structure from the first printed-circuit board. The first printed-circuit board mounts circuits having a first noise resistance property (such as recording/reproduction control circuit 6, A/D converter 5 in Fig. 1), and a circuit (parameter holding circuit 4 in Fig. 1) which holds parameters unique to the disk enclosure. The second printed-circuit board mounts circuits (SPM/VCM control circuits 24 and 25, interface control circuit 29 and processor 28 in Fig. 2) which have a second noise resistance property which is superior to the first noise resistance property. The circuits on the second printed-circuit board include a switch (31 in Fig. 2) for selecting either of one first printed-circuit board (exchangeable part 21 includes the disk enclosure and a first printed-circuit board in Fig. 2)

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connected to the second printed-circuit board (23 in Fig. 2) and another first printed-circuit board
(exchangeable part 22 includes the disk enclosure and a first printed-circuit board in Fig. 2)
connected to the second printed-circuit board (23 in Fig. 2). The disk apparatus is adapted to
connect with an upper system 32 (such as a portable or desktop computer).

Conventional magnetic disk apparatus have only a single printed-circuit board for a single disk enclosure. Such single printed-circuit boards mount all of the circuits for controlling the disk enclosure. Thus, when the disk enclosure is exchanged for another disk enclosure, all of the circuits for each disk enclosure must also be exchanged because all of the circuits are on the same single printed-circuit board as the disk. This leads to a wasted cost in replacing all of the circuits for each disk enclosure and maintains a high cost for such a disk exchange. It also limits miniaturization of such a disk enclosure

By contrast, the present invention provides a disk apparatus which includes two separate printed-circuit boards. A first printed-circuit board (21 and 22 in Fig. 2) includes the disk enclosure and is only required to also include those circuits which are unique to the disk enclosure (such as the parameter holding circuit 4 in Fig. 1). A second printed-circuit board (23 in Fig. 2) includes other circuits. Thus, when the disk enclosure requires an exchange with another disk enclosure, only those circuits on the first printed-circuit board are exchanged. Thereby significantly reducing the cost of the exchange.

Additionally, this first exemplary embodiment of the present invention includes a switch for selecting either of one first printed-circuit board connected to said second printed-circuit board and another first printed-circuit board connected to said second printed-circuit board.

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Therefore, as shown in Fig. 2, this first exemplary embodiment includes 1) one first printed-circuit board (21); and 2) another first printed-circuit board. Both of these are connected to the second printed-circuit board 23. The switch is only on the second printed-circuit board 23 and is not located on the upper system 32.

In addition to having all of the advantages listed above over the conventional disk apparatus, this configuration enables a single processor 28 to control the two first printed-circuit boards 21 and 22. Thereby improving the capacity of the disk apparatus as well as improving the cost ratio of any exchange of the first printed-circuit board.

In a second exemplary embodiment of the invention as recited in independent claim 16, the second circuit board is separated into a third printed circuit board (52 in Fig. 3) and a fourth printed circuit board (47 in Fig. 3). The third printed circuit board 52 includes the interface control circuit 53 and the fourth printed circuit board 47 includes other circuits, such as a processor 49 and an SPM/VCM control circuit 40. This second exemplary configuration is advantageous over the conventional disk apparatus because it does not require the entire magnetic disk apparatus to be changed when the interface format changes. Only the third printed circuit board is required to be changed when the interface format changes.

II. THE TAKAO ET AL. REFERENCE

The Office Action refers to the Takao et al. reference as JP 5-81848A. This is incorrect.

The Takao et al. reference is JP 5-81846A.

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The Examiner alleges that claims 1-10 and 12-16 are obvious over Takao et al. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by this reference and that it would not have been obvious to one of ordinary skill in the art to modify Takao et al. to remedy these deficiencies.

Firstly, Applicant submits that Examiner Chen can point to no motivation or suggestion in the references to urge the modification as alleged by Examiner Chen. Indeed, Examiner Chen does not even support the combination by identifying a reason for combining the references. Rather, Examiner Chen attempts to "bootstrap" a motivation from an alleged existence of features as "general practice in the art." For example, Examiner Chen asserts that it would have been obvious to provide a switch on a second printed circuit board because "to realize the selecting of disk drive by the second printed-circuit board, the second printed circuit board must include a switch." This logic is circular. Examiner Chen has failed to provide any motivation at all for providing a switch on a second printed-circuit board. Examiner Chen has also failed to provide any motivation for why the second printed circuit board should "realize" the selecting of disk drives. Examiner Chen also provides contradictory statements, because at one point Examiner Chen states that "the switching is controlled by the main system" and now alleges that the "selecting" is performed by the second printed-circuit board.

Secondly, even if combined as alleged by Examiner Chen, the resulting modification fails to teach each and every feature recited in independent claims 1 and 16.

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The Takao et al. reference appears to disclose only a single set of disk enclosures and first printed circuit boards. Takao et al. discloses a first case 2a and a second case 2b. The number of circuits on the first case 2a is minimized and moved to the second case 2b.

Takao et al. discloses that at least the logic operation circuit (processor) is in the second case 2b [0009]. This configuration minimizes the generation of heat and reduces the influence of the noise generated by the logic operation circuit upon the writing operation of the magnetic head [0033] Takao et al. does not make any mention of any second set of disk enclosures and first printed circuit boards and, therefore, does not disclose, nor have any need for, a switch to select between the sets as recited in independent claim 1. Thus, Takao et al. does not teach or suggest a second printed circuit board including a switch for selecting either of one first printed-circuit board connected to the second printed-circuit board and another first printed-circuit board connected to second printed-circuit board as recited in independent claim 1.

The Office Action admits that Takao et al. does not teach or suggest the switch as recited in independent claim 1. However, the Examiner attempts to remedy the deficiencies of Takao et al. by taking "official notice." Pursuant to M.P.E.P. § 2144.03, Applicant hereby traverses this assertion and requires Examiner Chen to support each assertion on page 3 of the Office Action by providing a citation to a reference properly combinable with the Takao et al. reference for each specific assertion of "general practice in the art."

Applicant also notes that M.P.E.P. § 2144.03 requires that "Assertions of technical facts in areas of esoteric technology must always be supported by citation of some reference work" and that "applicant must be given the opportunity to challenge the correctness of such assertions."

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This assertion by Examiner Chen that certain deficiencies in the primary reference may be remedied by taking official notice in an Office Action which includes a Final Rejection without providing a citation to any references in support of this statement, denies the Applicant the opportunity to challenge the correctness of these assertions. Applicant respectfully requires that Examiner Chen provide citations for every assertion of "general practice in the art" relied upon for his taking of official notice AND hereby requests the withdrawal of the finality of the rejection to provide the opportunity to challenge the correctness of Examiner Chen's evidence which are required to be provided in support of Examiner Chen's taking of official notice.

Examiner Chen has taken "official notice" that "as a general practice in the art" many computers are equipped with multiple disk drives. Examiner Chen attempts to assert that it is "general practice in the art" that a main system of a computer communicates with disk drives through "the second printed-circuit board." Pursuant to M.P.E.P. § 2144.03, Applicant hereby respectfully requires Examiner Chen to provide evidence of a "general practice in the art" that main systems of computers communicate with multiple disk drives through second printed-circuit boards.

Even assuming arguendo that Examiner Chen will be successful in providing citations to references as evidence supporting his taking of official notice, Applicant notes that the assertions provided by Examiner Chen in the Office Action is prima facie improper obviousness rejection. Examiner Chen's "official notice" that a "computer can communicate with only one disk drive at one time, and can switch from one disk drive to another. This switching is controlled by the main system and realized by the second printed-board" does not remedy the deficiencies of

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Takao et al. by providing evidence of a switch for selecting either of one first printed-circuit board connected to the second printed-circuit board and another first printed-circuit board connected to second printed-circuit board as recited in independent claim 1.

Indeed, Examiner Chen's "official notice" does not provide any evidence whatsoever of a switch on a second board at all. Let alone, a switch which resides on a second printed circuit board with is connected to one first printed-circuit board and another first printed-circuit board and which is adapted to select between these first printed-circuit boards.

Examiner Chen also makes a bald, assertion which is completely unsupported by evidence that "to realize the selecting of a disk drive by the second-printed circuit board, the second printed-circuit board must include a switch." Examiner Chen does not even attempt to provide any reference at all in support of this allegation. Applicant respectfully submits that Examiner Chen's allegation here is not supported and is clear use of the Applicant's teachings against the inventor's own invention. Clearly this is improper hindsight.

Examiner Chen also asserts that Takao et al discloses one of a case 2a and another of one case 2a in Fig. 12. However, Applicant notes that Fig. 12 in Takao et al. only discloses a single case 2a, not a second case 2a.

With regard to claims 12 and 16, Examiner Chen alleges that Takao et al. discloses a third printed circuit board and a fourth printed circuit board. This is clearly wrong. Rather, Takao et al. discloses an interface 5 and a logic operation circuit 6 which both reside on a single printed-circuit board 2b. Nowhere within Takao et al. is there any teaching that the interface 5 is a printed circuit board or that the logic operation circuit 6 is a printed circuit board. To the

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contrary, to quote Examiner Chen, it is "general practice in the art" for these devices to be placed together on the same printed circuit board 2b as is shown in Fig. 1 of Takao et al.

An object of the Takao et al. reference is to decrease the size and weight of a hard disk drive and to prevent malfunction due to the heat in a case. Therefore, the Takao et al. reference only separates a disk, an R/W amplifier, a VCM driver and a motor drive from the logic operation circuit 6, and does not separate the logic operation circuit 6 from the information device circuit 4. The gist of the Takao et al. reference is only to move the logic operation circuit 6 from the first case to the second case. In paragraph [0012] of the Takao et al. reference, there is a disclosure that "2nd case 2b is included in the mainframe 45 (refer to the Fig. 11) of a personal computer."

The Examiner alleges that the processor of claim 5 corresponds to the information device circuit 4 and logic operation circuit 6 of the Takao et al. reference. However, this is a misunderstanding of the Takao et al. reference. That is, the information device circuit 4 is connected to the logic operation circuit 6 through the interface 5. Here, the Examiner has admitted that the interface circuit with an upper system as recited in claim 10 corresponds to the interface 5. Therefore, the information device circuit 4 belongs to the upper system.

According to the present invention, the second printed-circuit board is separated from the upper system in structure and is connected to the upper system through the interface control circuit. On the other hand, the case 2b includes the interface 5 and information device circuit 4 belonging to the upper system as well as the logic operation circuit 6. Therefore, the case 2b does not correspond to the second printed-circuit board of claims 1 and 16.

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In addition, the block 5 surrounded by the dotted rectangle as shown in Fig. 3 of the Takao et al. reference is the interface shown in Fig. 1 of the Takao et al. reference, and the block 6 surrounded by the dotted rectangle as shown in Fig. 3 of the Takao et al. reference is the logic operation circuit as shown in Fig. 1 of the Takao et al. reference. Fig. 3 of the Takao et al. reference merely shows the details of the interface 5 and logic operation circuit 6 and does not show that the interface 5 and the logic operation circuit 6 are separated in structure. Therefore, the features of claim 16 is not disclose or suggested by the Takao et al. reference.

Therefore, contrary to the allegations of Examiner Chen, none of the references, either alone or in combination, teach or suggest each and every element of the claimed invention. Therefore, the Examiner is respectfully requested to withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully submits that claims 1-3, 5-10, 12 and 14-16, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.


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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 11/20/02


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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the claims:

Please cancel claim 4 without prejudice or disclaimer.

Please amend claims 1, 12 and 14-16 as follows:

1. (Twice Amended) A magnetic disk apparatus comprising:
 - a disk enclosure;
 - a first printed-circuit board which is paired with said disk enclosure; and
 - a second printed-circuit board which is connected to said first printed-circuit board via a cable and is separated in structure from said first printed-circuit board;wherein said first printed-circuit board mounts circuits which have a first noise resistance property, and a circuit which holds parameters unique to said disk enclosure; [and]
 - wherein said second printed-circuit board mounts circuits which have a second noise resistance property which is superior to said first noise resistance property, [and]
 - wherein said circuits on said second printed-circuit board include a switch for selecting either of [a first group including one said disk enclosure and] one of said first printed-circuit board connected to said second printed-circuit board and [a second group including another said disk enclosure and] another of said first printed-circuit board connected to said second printed-circuit board, and
 - wherein said second printed circuit board is separated from an upper system in structure and comprises an interface control circuit that interfaces with the upper system.

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12. (Twice Amended) The magnetic disk apparatus of claim 1 [4], wherein said circuits on said second printed-circuit board [is] are separated into a third printed circuit board and a fourth printed circuit;

wherein said third printed circuit board mounts [an] said interface control circuit; and

wherein said fourth printed circuit board mounts said circuits other than said interface control circuit [board].

14. (Twice Amended) The magnetic disk apparatus of claim 1 [4], wherein said circuits on said second printed-circuit board [include] comprise a processor.

15. (Twice Amended) The magnetic disk apparatus of claim 1 [4], wherein said circuits on said second printed-circuit board [include] comprise a spindle motor/voice coil motor control circuit.

16. (Amended) A magnetic disk apparatus comprising:

a disk enclosure;

a first printed-circuit board which is paired with said disk enclosure; and

a second printed-circuit board which is connected to said first printed circuit board via a cable and is separated in structure from said first printed-circuit board,

wherein said first printed-circuit board mounts circuits [have] having a first noise resistance property, and a circuit which holds parameters unique to said disk enclosure,

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wherein said second printed circuit board mounts circuits which have a second noise resistance property which is superior to said first noise resistance property,

wherein said second printed-circuit board is separated into a third printed circuit board and a fourth printed circuit board in structure, and wherein said third printed circuit board is separated from an upper system in structure and mounts an interface control circuit that interfaces with the upper system, and

wherein said fourth printed circuit board is separated from the upper system in structure and mounts said circuits other than said interface control circuit.